

REMARKS

The Examiner has required that a specific reference be made to the prior applications from which priority is claimed. In response, Applicants attach an Application Data Sheet, containing the required references.

Please note that the priority claims were made in the application papers, including the inventors' Declaration, the transmittal documents for the application, and the copy of the translated PCT Request submitted with the application. Also, the priority information is given on the official filing receipt. Therefore, Applicants submit that the priority claims were made at the time of filing, and no petition is required.

Applicants have amended the specification to correct the errors noted by the Examiner. Applicants believe that these amendments overcome the Examiner's objection to the specification.

All of the claims have been rejected, either under 35 USC 102, based on Jackson, or under 35 USC 103, based on Jackson in view of Schlöpfer. In the following paragraphs, Applicants will show that the invention, as presently claimed, is not anticipated either by Jackson or Schlöpfer, and is also not suggested by the combination of these references.

The intervertebral implant of the present invention has the following combination of structural features which are not shown or suggested in the prior art:

1) The implant has a pair of planar walls and a pair of convex walls, the convex walls being convex along the transverse axis of the implant (i.e. the height of the implant, defined by the distance between the upper and lower walls, varies along the transverse axis); and

2) The implant has a closed anterior wall and divergent side walls and divergent upper and lower walls.

As explained in the specification, the above-described structure has the advantage that it avoids the formation of lesions to the spinal cord during insertion of the implant between adjacent vertebrae. The structure also allows easy and progressive rotation of the implant after insertion. The divergent upper and lower walls also make it easy to maintain adjacent vertebrae at an appropriate physiological lordosis angle.

Claim 14 has been amended to include all of the structural features listed above. In particular, Claim 14 has been amended to require that the upper and lower walls be convex along the transverse axis. Specifically, Claim 14 now recites the longitudinal and transverse axes of the implant body, and recites that the height of the body, defined by the distance between the upper and lower walls, varies along the transverse axis. This is a more precise definition of the phrase "convex along the transverse axis". It is what is shown most clearly in Figures 1 and 7 of the present application.

In the following sections, Applicants will explain why Claim 14 is neither anticipated nor suggested by the references.

1. Jackson

Jackson shows an intervertebral implant having the general shape of a parallelepiped. That is, the cross-section of the implant of Jackson is square, as shown, for example, in Figures 1-3. As such, the implant of Jackson has relatively sharp longitudinal edges. Such edges may cause lesions to the spinal cord or the roots during insertion of the implant between adjacent vertebrae. These sharp edges are avoided by the structure of the present invention.

Jackson does not teach or suggest a structure in which two opposing walls are flat, and two opposing walls are convex (curved). On the contrary, all of the walls of Jackson are generally flat. Therefore, Jackson does not have the partly planar and partly convex structure of the implant of the present invention.

Furthermore, the implant of Jackson does not have a closed anterior wall. The Examiner correctly notes that the anterior wall is indicated by reference numeral 30. But, as is clearly shown in Figures 4-6, the anterior wall of Jackson has a break, such that the pieces forming that wall can move apart when expansion member 7 is inserted, as shown in Figure 7. Thus, the anterior wall of Jackson is not closed, but rather is formed of two sections which are intended to move apart.

By contrast, the anterior wall of the implant of the present invention is solid, and permanently closed off. It does not allow expansion of the implant, as in Jackson. Jackson lacks the closed anterior wall required by Claim 14.

Jackson does not show divergent side walls. In Jackson, the implant is a parallelepiped, in which the side walls are parallel, and the upper and lower walls are parallel. Even when the expansion member is inserted, the

side walls of Jackson still remain parallel, and do not diverge. In the present invention, the side walls are permanently divergent. Therefore, Jackson does not meet the requirement of Claim 14 that the side walls be divergent.

With regard to the divergence of the upper and lower walls, it is true that the upper and lower walls of Jackson diverge (Figure 7) when the expansion member 7 is inserted. However, the present claims require both a closed anterior wall and divergent upper and lower walls. Jackson clearly does not have both of these features. Jackson could not have a closed anterior wall, while still permitting the desired expansion illustrated by Figure 7. Therefore, Jackson lacks the combination of a closed anterior wall and divergent upper and lower walls, required by Claim 14.

In summary, Jackson does not show a pair of opposed planar walls, and a pair of opposed convex (curved) walls. Jackson does not show a closed anterior wall. Jackson does not show divergent side walls of any kind. And Jackson does not show the combination of a closed anterior wall and divergent upper and lower walls.

For all of the above reasons, Jackson neither anticipates nor suggests the features recited in Claim 14.

2. Schläpfer

The patent to Schläpfer does show a pair of flat walls and a pair of convex walls. However, the convex walls of Schläpfer are convex along the longitudinal axis, not the transverse axis. This feature is clear from Figure 1 of Schläpfer.

Thus, in Schläpfer, for each cross-section taken along the transverse axis, the height (the distance from the lower wall to the upper wall) is constant, as one moves along the transverse axis. Schläpfer therefore has

the opposite convexity compared to the present invention, in which the height varies along the transverse axis. The difference between these structures is apparent from a comparison of Figure 1 of the present application with Figure 1 of Schläpfer.

Schläpfer does have a closed anterior wall. But Schläpfer does not show divergent side walls, and divergent upper and lower walls. The present claims require that the side walls, and the upper and lower walls, be divergent toward the front (anterior). Schläpfer shows no such divergence. The side walls of Schläpfer are clearly planar and parallel to each other; there is no divergence. The upper and lower walls of Schläpfer, being longitudinally convex, tend to converge toward the front; they do not diverge.

In summary, Schläpfer lacks the divergent side walls and upper and lower walls required in Claim 14. Schläpfer shows a pair of convex upper and lower walls, but the convexity is in the orthogonal direction relative to what is claimed in Claim 14.

3. The combination of Jackson and Schläpfer

When Jackson and Schläpfer are combined, the result does not yield the present claimed invention.

First, Jackson does not suggest a pair of flat side walls and a pair of convex (curved) upper and lower walls. While Schläpfer shows convex upper and lower walls, it does not show convexity in the transverse direction, as is presently claimed. Therefore, the claimed orientation of convexity is not found in the combination of Jackson and Schläpfer.

Secondly, neither reference shows both a closed anterior wall and upper and lower walls which diverge toward the front. The anterior wall of

Jackson has an opening to permit expansion and is therefore not closed. The anterior wall of Schlöpfer is closed, but Schlöpfer does not show pairs of walls which diverge toward the front. Thus, the combination of Jackson and Schlöpfer fails to suggest a structure which has both a closed anterior wall and divergent upper and lower walls.

Thirdly, neither reference shows side walls which diverge toward the front. In Jackson, the side walls are always parallel to each other. In Schlöpfer, the same is true. Therefore, the combination of Jackson and Schlöpfer cannot yield the claimed feature.

Therefore, Claim 14 is believed allowable over Jackson or Schlöpfer, whether taken individually or in combination.

New Claim 27 includes all of the limitations of Claim 14, and adds the feature wherein the width of the implant, as defined by the side walls, is less than its height, defined by the upper and lower walls, in each cross-section taken along the longitudinal axis.

In Jackson, the width of the implant is clearly not less than its height. Since the implant of Jackson clearly has a square cross-section, the width and height of the implant are substantially equal.

In Schlöpfer, the width of the implant may become less than the height, but only at or near the point of maximum height. New Claim 27 requires that the width be less than the height along each cross-section taken along the longitudinal axis. This feature is therefore neither shown nor suggested in Jackson or Schlöpfer. Applicants submit that Claim 27 is allowable for this additional reason.

The remaining claims, not discussed explicitly above, depend from Claim 14, either directly or indirectly, and are therefore also believed allowable.

Applicants have considered the other references cited by the Examiner but not applied to the claims. These references are not believed to affect the patentability of the pending claims.

Applicants submit that the claims, as amended, define a patentable invention. Applicants therefore request reconsideration by the Examiner and early favorable action.